

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

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Ex parte KLAUS-PETER SCHMOLL  
and FRIEDRICH BOECKING

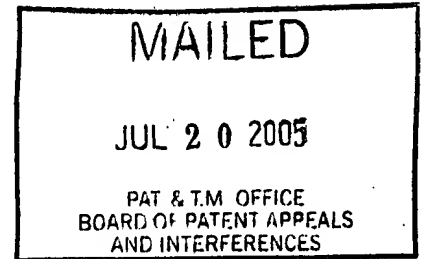
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Appeal No. 2005-1494  
Application No. 09/763,254

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ON BRIEF

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Before HAIRSTON, KRASS, and MacDONALD, Administrative Patent Judges.  
KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-8.<sup>1</sup>

The invention pertains to a piezoelectric actuator, illustrated by reference to independent claim 1, reproduced as follows:

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<sup>1</sup>We note in passing that claim 8 is an improper claim, in accordance with MPEP §608.01(n), because it is a multiple-dependent claim which depends from another multiple-dependent claim.

1. A piezoelectric actuator with

a multilayered structure of piezoelectric layers (2) and electrodes (3,4) disposed between them,

an alternating lateral contacting (5,6) of the electrodes (3,4), wherein in the region between the two piezoelectric layers, which contains one of the electrodes (3,4) that are respectively contacted on opposite sides from another, there is a neutral phase (7) without an electrode layer, and

a shape of the multilayered structure which permits an increased mechanical stress to be exerted in the vicinity of the neutral phases (7) when the piezoelectric actuator (1) is clamped in place perpendicular to the layer structure.

The examiner relies on the following references:

Issartel	5,245,734	Sep. 21, 1993
Hanafy	5,945,770	Aug. 31, 1999

Claims 1-8 stand rejected under 35 U.S.C. §103. As evidence of obviousness, the examiner offers Hanafy and Issartel with regard to claims 1-4, and 6-8, adding "common knowledge" to this combination with regard to claim 5.

Reference is made to the brief and answer for the respective positions of appellants and the examiner.

OPINION

At the outset, we note that the examiner has withdrawn a rejection of claim 6 under 35 U.S.C. §112, second paragraph, and an objection to the drawing.

In accordance with the grouping of claims at page 7 of the brief, all claims will stand or fall with independent claim 1. Thus, we will focus our discussion on this claim.

With regard to claim 1, it is the examiner's position that Hanafy discloses a multi-layered structure of piezoelectric layers 24, 26, 28, and electrodes 40, 70, disposed between them. The examiner also cites the contacts 50 and 52 of Hanafy, and a region between two piezoelectric layers. The examiner points to Figures 2 and 3 of Hanafy for a "shape," cited as a "difference in elevation," for permitting an increased mechanical stress to be exerted in the corners when the piezoelectric actuator is clamped in place perpendicular to the layer structure.

The examiner relies on Issartel for a showing of a "neutral phase" without an electrode layer, and an insulating layer 4a disposed between the layers of the multi-layered structure.

The examiner then concludes that it would have been obvious "to use the shape of the multi-layered structure disclosed by HANAFY on the neutral phase piezoelectric actuator disclosed by ISSARTEL for the purpose of providing better electrical match between the ultrasound transducer and the ultrasound system to which it is coupled to [sic]" (answer-page 4).

For their part, appellants argue that Hanafy shows a transducer "loaded from mall [sic, all?] sides by the same force resulting from the atmospheric pressure" and that this "does not provide any different stress in the piezo layers" (brief-page 8). Further, argue appellants, Hanafy's transducer "is also not an actuator whose action, such as for example control or actuation is applied. Instead, it is a transducer with a movable outer surface which produces no definite oriented force" (brief-page 9). These arguments of appellants are not persuasive since they do not specifically point out any specific language in instant claim 1 which is alleged to distinguish over the applied references.

When appellants point to specific claim language alleged to distinguish from the prior art, beginning at page 9 of the brief, appellants point to "an increased mechanical stress to be exerted...when the piezoelectric actuator is clamped perpendicular to the layered structure in the region of the neutral phase 7." Appellants further allege that "no

neutral phase without an electrode layer between the piezo layers is available in the prior art" (brief-page 9).

As we view the instant claim language and the applied prior art, it appears to us that even Issartel, alone, discloses a piezoelectric actuator with a multilayered structure of piezoelectric layers and electrodes disposed between them (see, for example, Figure 1, having piezoelectric layers 1, and electrodes 2a and 2b disposed between the layers); an alternating lateral contacting (3a, 3b) of the electrodes 2a and 2b. The space between the ends of the electrodes and the contacts, called "neutral phase" by appellants, is shown, for example, in Figures 5 and 6, and space 4a in Figure 1 of Issartel.

Now, the claim language apparently relied upon by appellants for patentability is in the last paragraph, viz.,

a shape of the multilayered structure which permits an increased mechanical stress to be exerted in the vicinity of the neutral phases (7) when the piezoelectric actuator (1) is clamped in place perpendicular to the layer structure.

We view the claim language to be much broader than does appellants. Whatever "shape" is being called for in the claims, it is clear that the structure of Issartel has a "shape." That "shape" is to permit an increased mechanical stress to be exerted in the vicinity of the space between the electrodes and the side contact. This is so because "an increased stress" is always "permitted" by the prior art. Such increased mechanical stress may, in fact, damage, or completely ruin, the electrodes (as shown in appellants' Figure 2, for example), but it is always "permitted." Instant claim 1 does not indicate what will happen or not happen based on this increased mechanical stress. There is no indication that such mechanical stress is limited in any manner by the instant claimed invention. The claim merely says that the shape of the structure will permit an increased mechanical stress to be exerted in the vicinity of the neutral phases. Clearly, the prior art "permits" increased mechanical stress, albeit the structure may be damaged, but the claim language does not preclude this from happening.

Further, claim 1 states that this increased mechanical stress is permitted "when the...actuator...is clamped in place perpendicular to the layer structure." This language is so broad that it appears to offer no limitation to the other claimed elements. As the examiner points out, correctly, in our view, all piezoelectric actuators are "clamped," or fixed, in some manner. Otherwise, the actuator cannot work. The situation is similar to

the slide on an automatic pistol. Without the hand holding the pistol, and providing a resistance, fixing the position of the pistol, the slide mechanism ejecting a casing and causing the chambering of the next round will not work. If the piezoelectric actuator is not held in place, in a fixed position, there is no resistance against which the actuator works.

With regard to the “perpendicular” limitation, the recitation is too broad to convey any specific meaning to the claim. That is, the term “perpendicular” is a relative term, and the claim fails to specify where, exactly, the clamp holds the piezoelectric actuator. To say that an actuator “is clamped in place perpendicular to the layer structure,” this would appear to cover clamping the actuator perpendicular to either the lateral or the longitudinal (or any other) direction of the layer structure. Clearly, whatever is holding the structure in place in Issartel, is clamping the structure in one of these directions since it is held in *some* position, or direction.

With regard to appellants’ argument that “no neutral phase without an electrode layer between the piezo layers is available in the prior art” (brief-page 9), it appears clear to us that Issartel discloses exactly this structure. See Issartel’s abstract, for example, where it is stated that electrode structure “is provided with pressure protected boundary discontinuities which form areas in which electrode edges do not make

contact with the common electrical collectors of the piezoactuators... As shown in Figures 1, 5, and 6 of Issartel, the gap between the end of the electrodes and the end contact of the actuator is a "neutral phase," as that term is defined by appellants. Further, these neutral phases, e.g., items 4a in Issartel's Figure 1, are "without an electrode layer" to the extent that the electrode has ended and there is a gap between the electrode end and the current collectors 3a and 3b. We do not see where this claim language distinguishes over Issartel.

We will, therefore, sustain the rejection of claims 1-8 under 35 U.S.C. §103 as the examiner has set forth a somewhat reasonable case of obviousness and appellants have not rebutted the examiner's case with any convincing argument or objective evidence.

The examiner's decision is affirmed.



AFFIRMED

KENNETH W. HAIRSTON  
Administrative Patent Judge

ERROL A. KRASS  
Administrative Patent Judge

ALLEN R. MacDONALD  
Administrative Patent Judge

BOARD OF PATENT  
APPEALS  
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